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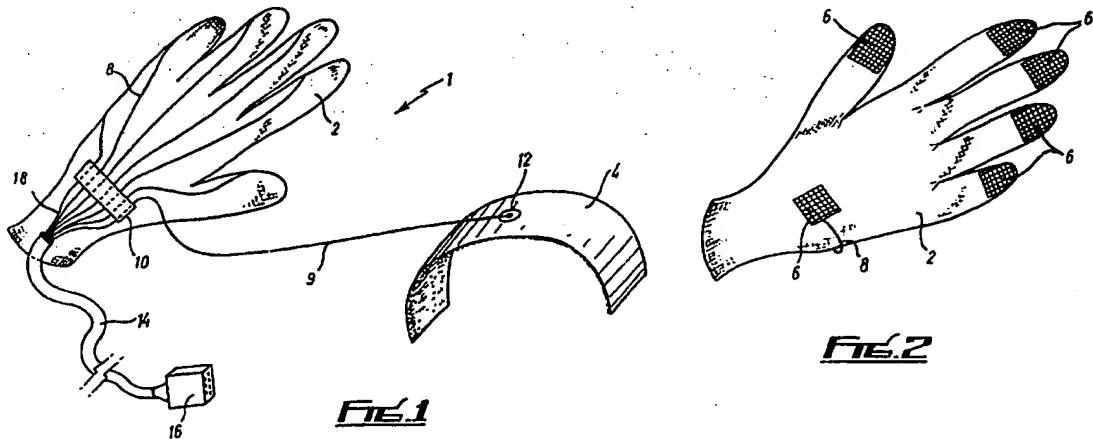
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(54) Control device, eg for computers, with contacts on the users hand<sup>1</sup>

(57) A control device that forms a switch having first contact 6 on the fingers of a user's hand by means of a glove 2 or a skeletal glove (22, Figs. 3, 4) and a second contact in the form of a plate 4, (54) which may be segmented. The switch is closed by touching the plate with a finger carrying a first contact. Only minimal movement is required to open or close the switch. The control device may be applied to a computer, games machine, typing machine, software protection or data collection.



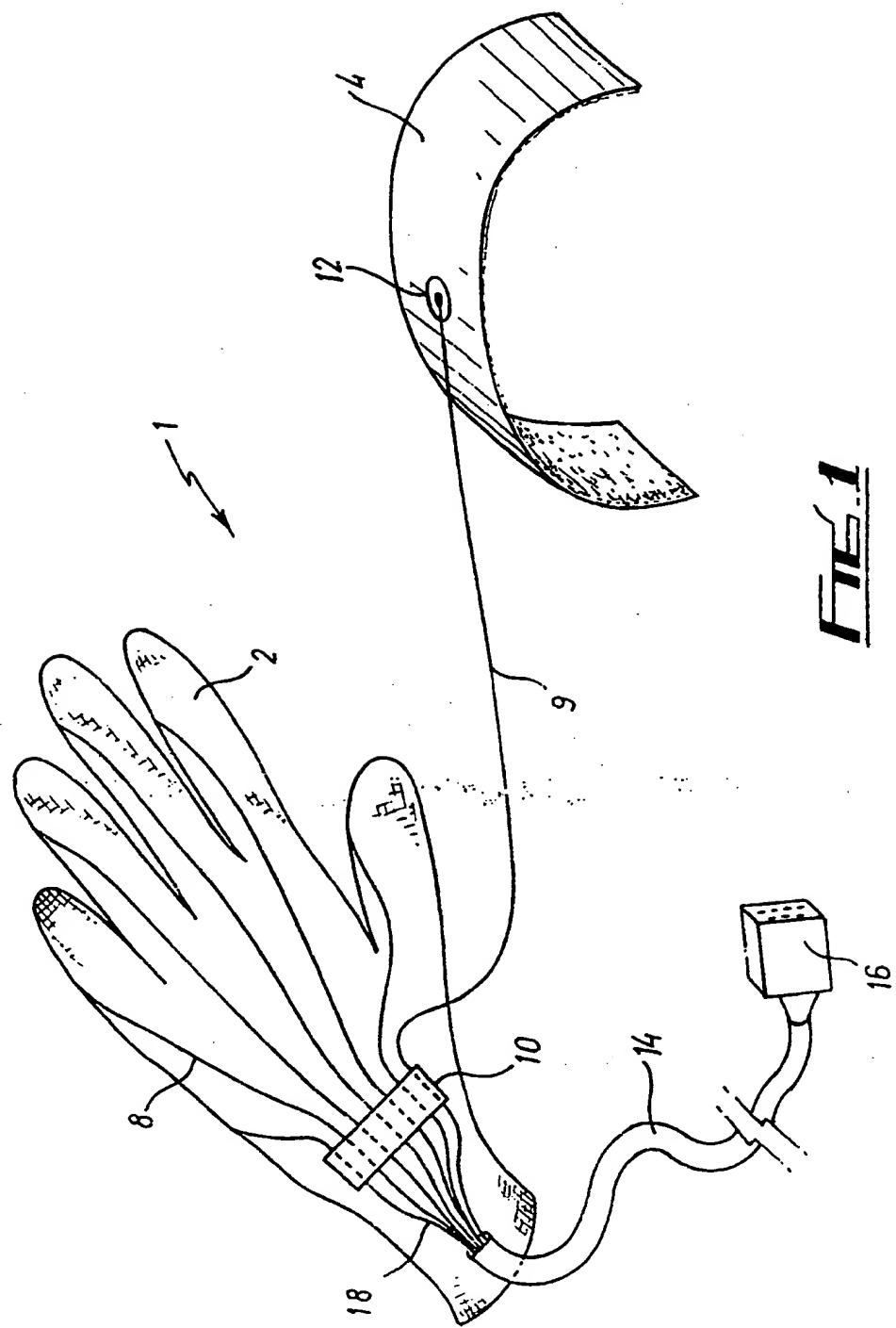
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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period provided by Rule 25(1) of the Patents Rules 1990.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

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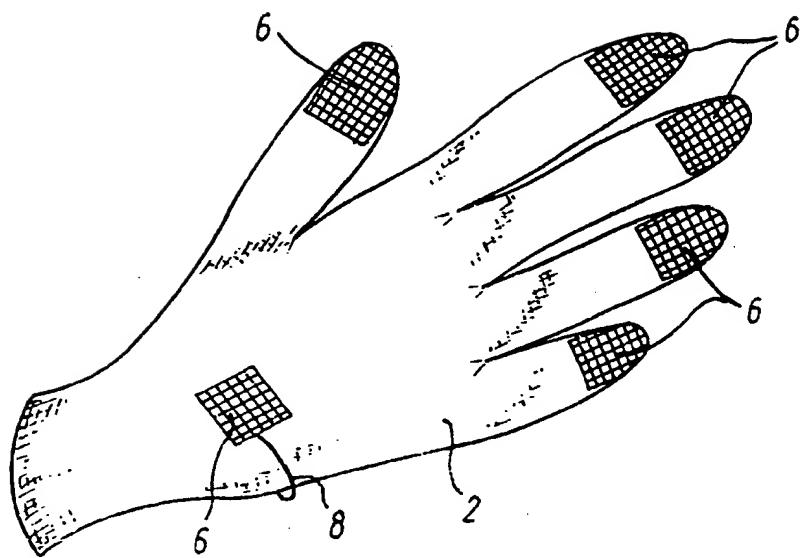
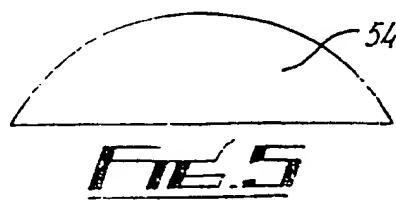
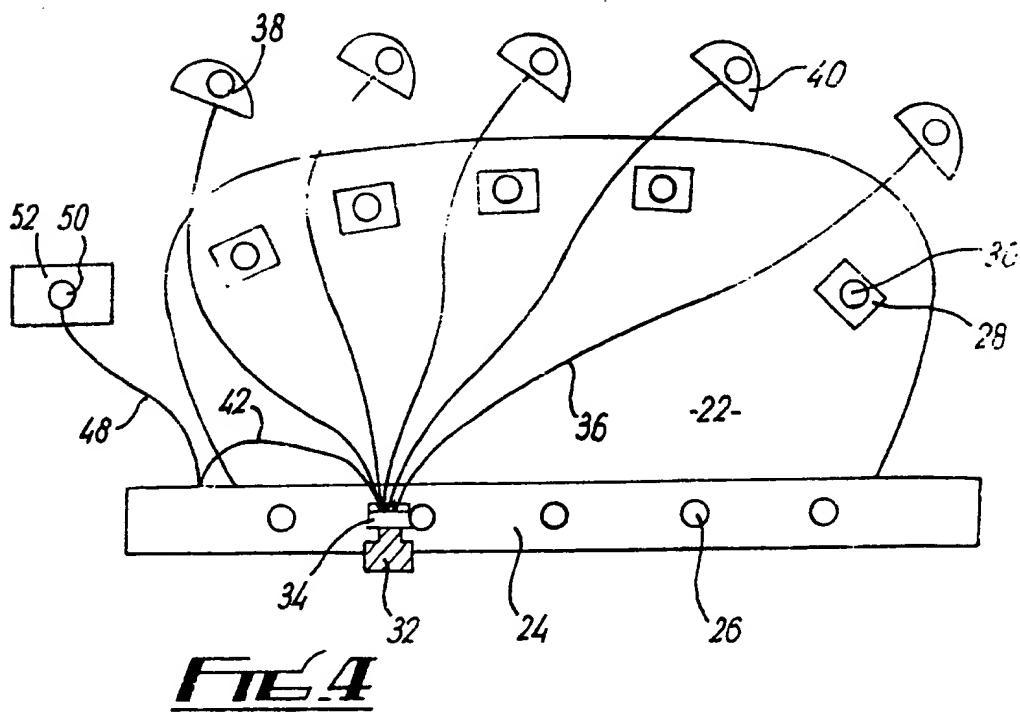
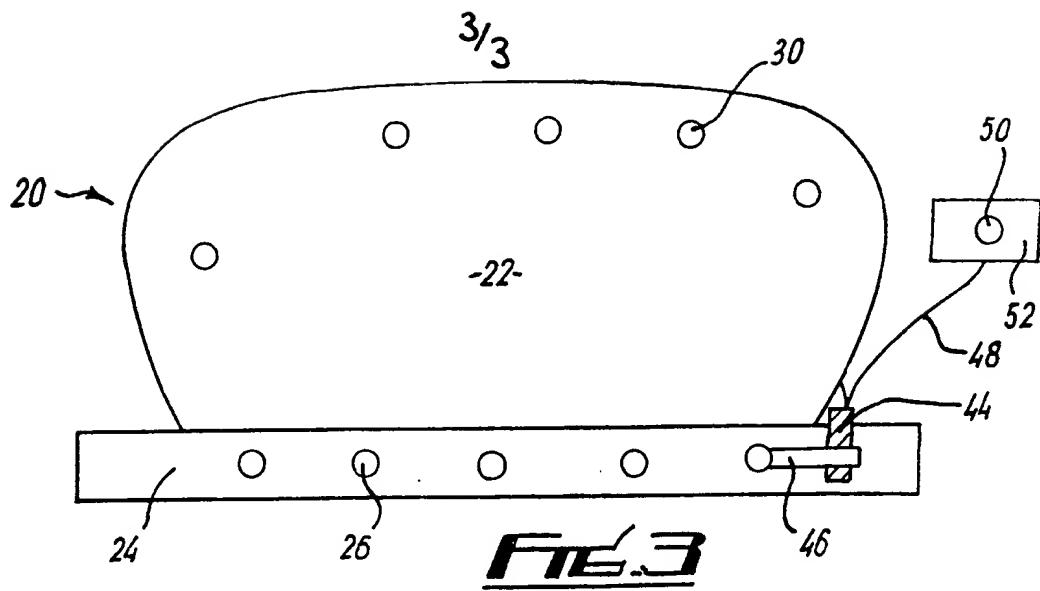


FIG. 2

34 44 95



**CONTROL DEVICE**

The present invention relates to a joystick, mouse or the like manual control device for a computer, games machine, typing machine or other similar device.

In the present description, the term "joystick" is to be taken to mean a joystick, mouse, keypad, manually operated control device or the like.

In general, such control devices as a mouse or a joystick give excellent manual control. However, it will be appreciated that there is a time delay inherent in all mechanical switches, even micro-switches, since it takes time for the moving parts to move. Furthermore, the operation of a joystick requires the movement of the whole hand in one direction or another and usually a control stick or button has to be held in order to activate particular functions. This can give rise to fatigue in the forearm or wrist of the operator particularly when used for an extended period of time.

The present invention has been made in order to overcome the above mentioned disadvantages by providing an improved control device which gives a faster response and/or reduces fatigue of the operator.

According to the invention there is provided a control device comprising one or more first contact means and a second contact means, each such first contact means forming an effective switch with said second contact means such that when such first and second contact means are in electrical contact the switch is closed and when such first and second contact means are not in electrical contact the switch is open and wherein at least one of the contact means is adapted to be mounted directly or indirectly on an operator's hand.

One or more of said first contact means or said second contact means may comprise a contact point or surface such as a metal plate or grid. Preferably the first contact means comprise metal surfaces attached to or forming part of a glove to be worn on the operator's hand. These surfaces may be sewn, stuck to or woven into the glove. However, it will be appreciated that the first contact means may comprise metallic surfaces adapted to be secured directly to the user's hand for example by adhesive patches or the like. Alternatively the first contact means may be in the form of a skeletal glove to be worn by the user or each contact means may be in the form of a thimble or ring to be worn on a finger.

Preferably, a first contact means is provided for each finger of the operator's hand and a contact means may also be located on the palm. With such first contact means, the

second contact means may be of a similar form, for example mounted on the glove, but preferably is in the form of a plate adapted to be fitted on the operator's thigh, to the arm of a chair or the like. The second contact means may be sewn onto or formed as part of the operator's clothing.

In an alternative embodiment of the invention, the first contact means comprise segments of a plate which as described may be adapted for fitting on the operator's thigh, an arm of a chair or the like. In this embodiment the second contact means is a metal surface adapted to be mounted on the operator's hand, for example directly by adhesive or on a ring or glove worn on the hand in use. Further such second contact means may be adapted for location on various parts of the hand. The first and second contact means are preferably connected to appropriate terminals of the computer or other device to be controlled. Preferably the second contact means is connected to the ground line and the first contact means are connected to respective signal lines of the computer or other controlled device.

According to the invention there is further provided a contact means for use in a control device of the invention, said contact means being adapted to be mounted directly or indirectly on a hand, and being electrically connectable to a controllable device such as a computer. Preferably such contact means is mounted on or forms part of a glove. The

invention further provides a method of controlling a device by means of a control device according to the invention.

It will be seen that using a control device of the invention, the slightest movement of a finger makes a circuit which gives an instant instruction to the computer or other device being controlled. The common terminal can be a curved plate adapted to be strapped to the thigh, arm of a favourite chair or the like, thus making what was a wrist straining two handed operation or at best a cumbersome one handed operation a much more relaxing and therefore less stressful exercise. Having so much control with one hand frees the other hand to operate a further control device such as a keyboard and this is particularly useful for some software packages where use of a keyboard, without relinquishing control of the joystick, provides optimum control.

Since the control device of the invention can be provided in the form of a glove, it can fit either hand and consequently a pair of such gloves would give the equivalent of operating two control devices or joysticks simultaneously. Such two control devices may be operated as separate independent control devices or as a single double function control device.

It will also be appreciated that any other operations necessary to control the computer for example by means of a

conventional keyboard, joystick, mouse or the like are in no way impaired by the wearing of the glove.

The common terminal or base plate could be segmented with each segment having a different function or purpose thus greatly increasing the switching possibilities. Thus, a keyboard having no moving parts could be provided the terminals of which could be part of a laminate with a flexible backing material. This would be applicable to, for example, a musical keyboard, a computer keyboard or any similar multi-function control board. With such an embodiment, the keyboard could be rolled up and put in one's pocket or the like giving a new degree of portability. Particular keys on such a device could be programmed to be operated by particular finger terminals so that the device could, for example, be used as a learning aid for typing or the like.

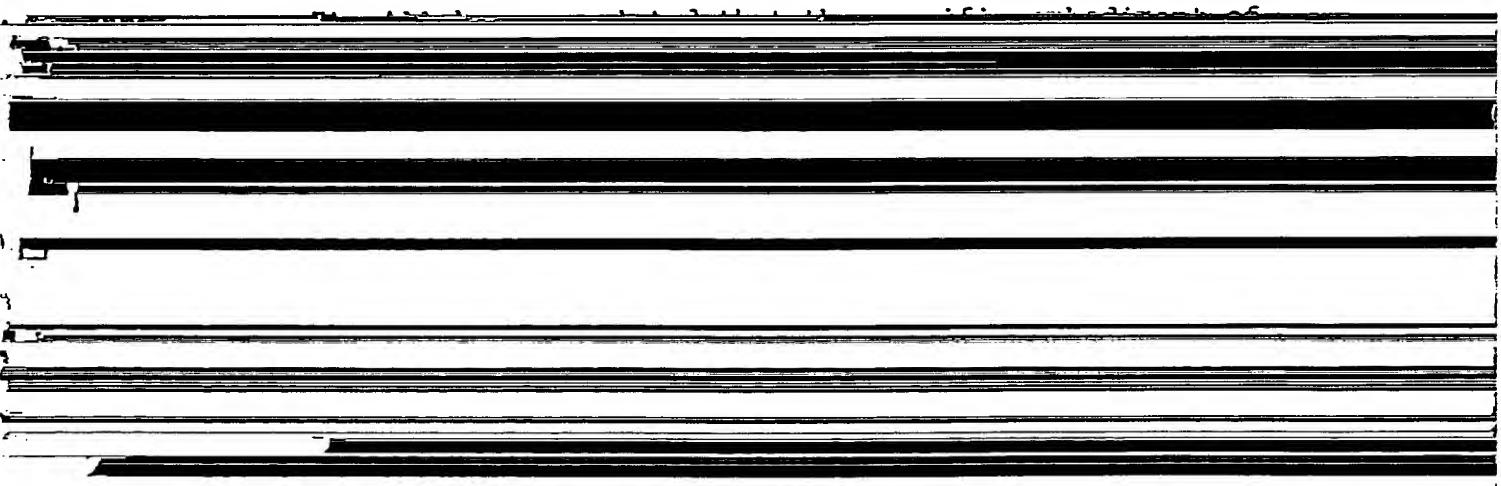
The invention will now be described further by way of example only and with reference to the accompanying drawings in which:-

Fig. 1 is a schematic representation of an embodiment of the invention showing the upper surface of a glove and a base plate; and

Fig. 2 is a schematic view of the under surface of the

glove of Figure 1.

Referring to the drawings, a control device 1 comprises a glove 2 and a base plate 4. The end of each finger of the glove has a metal grid 6 attached thereto on the lower surface of the glove. A metal grid 6 is also attached to the lower surface of the glove adjacent the heel of the hand. Each connecting wire 8 connects a grid 6 with a respective terminal on a connector 10. A further connecting wire 9 connects the base plate 4 to a further terminal of the connector 10. The remote end of the wire 9 may be connected to the base plate 4 by any suitable means 12 such as a screw/nut/washer arrangement. A lead 14 has a multi-terminal socket 16 at one end for connecting the control device to a computer or the like. The other end of the lead 14 is separated out into its individual wire elements 18 and each wire element 16 is connected to a terminal of the connector 10.



the invention as illustrated by the drawings is schematic

used, is preferably as small as practical and such that the wires 8, 9 or 18 may be disconnected and re-connected thereto by the user so that the user can select which wires 18 are to be connected to which contact points on the glove. The base plate 4 may have any suitable form but preferably is a curved rectangular metal plate with a soft underlayer such as rubber so that the plate fits comfortably over the users leg.

In use, the operator positions the base plate 4 wherever is most convenient for use and wears the glove 2 on one hand. Each contact 6 acts as an open switch which is closed when touched to the base plate 4. In the embodiment shown, the base plate is grounded by being connected via wire 9 and one of the wires 18 to the grounded terminal of the socket 16. However, it will be appreciated that the contacts provided on the glove may be grounded and the base plate may comprise electrically isolated segmented elements connected to respective wires 18 so that the effective switches are closed when any contact on the glove touches the appropriate element on the base plate. Such an embodiment would be particularly applicable for example when the control device is intended to have more than say six control functions, for example a multi-function keyboard where each segmented element corresponds to an individual letter or digit.

Referring to Figures 3 to 5, a further embodiment of the invention comprises a skeletal glove 20 having a hand portion 22 and a wrist strap 24. The wrist strap 24 may comprise a velcro strap so that the skeleton can be secured to the wrist portion of a glove worn by the operator. In this case the glove comprises felt or other suitable material to which the velcro adheres. It will be appreciated that any other suitable adhesive or other attachment means may be used instead of velcro. The hand portion 22 is secured to the wrist strap 24 by means of studs 26. Again it will be clear that any other suitable form of attachment means may be used. A series of velcro patches 28 are secured to the inside of the hand portion 22 by means of studs 30. The velcro patches 28 are arranged in such a position as to be securable to the finger portions of a glove.

As described above the strap and patches comprise velcro on one side thereof for attachment to a suitable glove. Alternatively the strap and patches may comprise double sided velcro so that when their respective ends are overlapped they secure together. In this case a glove is not required and the skeleton can be worn directly on the operator's hand.

The strap and patches may alternatively

comprise male and female velcro components so that they can be secured together or any other suitable securing means may be used.

A connector 32 is attached via a strap 34 to one of the studs 26 on the wrist strap. The connector 32 allows releasable connection of the control device to a computer terminal or the like. Wires 36 extend from the connector 32 to metal studs 38 which provide the electrical contact points for the control device. The studs 38 are mounted on velcro patches 40 adapted to be secured to the terminal ends of the finger portions of the glove. Straps, adhesive patches or any other suitable form of securing means may be used instead of the patches 40 so that the skeleton can be worn directly on the hand. Generally in use the wires 36 will lie between the hand portion 22 and the glove. A wire 42 extends from the connector 32 to a second connector 44 which is secured to the wrist strap 24 by means of strap 46 and one of the studs 26. The connector 44 allows connection to ground or OV if required. A further wire 48 extends from the connector 44 to a metal contact stud 50 provided on a velcro patch 52. The patch 52 is adapted to be secured to the palm of a glove and provides an additional or alternative ground contact point.

Referring to Fig.5 a metal semi-spherical hollow dish 54 may be used as the contacting surface for the various contact points of the skeletal glove. The shape of the dish facilitates easy use of the control device since the operator's hand can rest on and span the dish surface.

The invention also has application in such fields as software protection and data collection. In general software protection, for example on games software, consists of a break in the use of the software to be interrogated by the computer and requiring the input of a code or the like taken from the support manual or the package in which the software was purchased. The glove of the invention could be used to incorporate a device similar to the smart card such as a small chip similar to that used in a smart card but as part of the package, either on the package or on a card inside the package. When the software program required input of a code to prove that the user was a licensed user, the finger terminals of the glove could be touched down to appropriate terminals on the package or box which would be connected to the chip. In this way the computer could interrogate the chip and the chip would supply the proof of purchase such as the appropriate code. In this way the software could be

copied, but would be unusable unless the user also possessed the box or package. The operation of this type of software protection using the invention would be instantaneous, just a mere touch of the box, and would interrupt the software user to such a minimal extent that repetition would be of little annoyance to the user.

With regard to data collection, with the use of a portable computer data could be downloaded from remote data gathering devices such as measuring devices on production lines or production control devices. The operation would consist of just touching the terminals with the fingers and the portable computer could be programmed to do the rest.

It will be appreciated that the present invention has many possible applications apart from facilitating playing computer games.

It will be appreciated that the present invention is not intended to be restricted to the details of the above embodiments which are described by way of example only.

CLAIMS

1. A control device comprising one or more first contact means and a second contact means, each first contact means forming an effective switch with said second contact means such that when said first and second contact means are in electrical contact the switch is closed and when said first and second contact means are not in electrical contact the switch is open and wherein at least one of the contact means is adapted to be mounted directly or indirectly on an operator's hand.
2. A device as claimed in Claim 1, wherein one or more of said first contact means or said second contact means comprises a contact point or surface.
3. A device as claimed in Claim 2, wherein the first contact means comprises metal surfaces attached to or forming part of a glove.
4. A device as claimed in Claim 2, wherein the first contact means comprises metallic surfaces adapted to be secured directly to a user's hand.
5. A device as claimed in any preceding claim, wherein the first contact means comprises a skeletal glove.

6. A device as claimed in any preceding claim, wherein the first contact means is in the form of a thimble or ring.

7. A device as claimed in any preceding claim, wherein first contact means is provided for each finger of a user's hand.

8. A device as claimed in any preceding claim, wherein first contact means is provided on the palm of a user's hand.

9. A device as claimed in any preceding claim, wherein the second contact means is in the form of a plate.

10. A device as claimed in Claim 9, wherein the plate is segmented.

11. A device as claimed in Claim 9 or Claim 10, wherein the plate is shaped to fit on a support.

12. Contact means for use in a control device as claimed in any preceding claim, said contact means being adapted to be mounted directly or indirectly on

a hand and being electrically connectable to a controllable device.

13. Contact means as claimed in Claim 12, which is mounted on or forms part of a glove.

14. A method of controlling a controllable device comprising the use of a control device as claimed in any of Claims 1 to 11.



Application No: GB 9421696.7  
Claims searched: 1-11, 14

Examiner: John Twin  
Date of search: 15 March 1995

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): F2Y (YTB)

Int Cl (Ed.6): A41D 19/00, G06F 3/00, G06K 11/18

Other: Online WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US4613139 (Robinson)	1,3 at least
X	DE2718415 (Hartwig) - see eg WPI abstract accession no. 78-J8490A/45	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.